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Fish and Aquaculture Report

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Fishery Products

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Report Highlights:

Ghana is a net importer of fishery products. Post forecasts fish imports for Ghana in MY 2011 at 250,000 MT, up from 199,000 MT in MY 2010 due to increasing demand. Fish is imported from the European Union and some African countries to fill the seasonal and annual deficits. US fish exports to Ghana are limited. There is some growth in aquaculture production but it remains small.

General Information:
PRODUCTION

Table 1. Total fish Production (wild fish catch and aquaculture in '000 MT)

Year	2005	2006	2007	2008	2009	2010	2011
Marine(Wild catch)	322.8	323.6	291	343	326	305	300
Inland Waters(wild)	81.6	81.3	81.5	81	75.8	74	73
Aquaculture	1.15	1.67	3.26	5.6	7.2	10.2	10.5
Total	405.55	406.57	375.76	436.6	409	389.2	383.5

Source: Ministry of Food and Agriculture (Fisheries Commission).

Fishing is a significant economic activity in Ghana and is estimated to contribute 3 percent of the total GDP. Ghana's fishing industry is based on the resources from the sea (marine), rivers, lakes and lagoons and aquaculture. According to the Government of Ghana (GOG) fish production from marine, rivers, lakes and lagoons sources fluctuate, but are generally on the decline (table 1) due to overfishing. There is some growth in aquaculture production but it remains small and has not kept pace with the consumer demand for fish in Ghana. Marine fisheries account for over 80 percent of the fish consumed in Ghana. In recent times however, fresh water fisheries including aquaculture is increasingly contributing a considerable share of the supply.

Production (Wild Fish Catch from marine source)

Ghana has a marine coastline of nearly 343.8 miles and a total continental shelf area of about 24,000 square kilometers that supports a marine fishing industry. The Exclusive Economic Zone (EEZ) in Ghana waters is 200 nautical miles. The marine sub-sector in Ghana is the most important source of local fish production with the annual average domestic catch being 300,000 MT. The marine fisheries sub-sector delivers over 70 percent of the total fish supply in Ghana (MOFA sources).

Marine fisheries in Ghana are affected by a seasonal upwelling (December/January – February and July – September) that occurs in its coastal waters. During the upwelling periods biological activity increases in the sea that result in increased production of natural food sources and abundance of most marine fishes. Fish become more available for exploitation during these upwelling periods. Therefore large quantities of fish are caught during the major season (July-September) while very little fish are captured during the low or minor season, (December-January/February). According to GOG sources, fish stocks have been declining due to overfishing.

Table 2. Total fish catch from marine sources for the period 2005-2011(1000MT)

Year	2005	2006	2007	2008	2009	2010	2011
Marine(Wild catch)	322.8	323.6	290.7	343.90	326	305	300

Source: Ministry of Food and Agriculture (Fisheries Commission), Fishing Industry

Both the pelagic (migratory fish that feed above ocean bottom) and the demersal (sea bottom-feeding fish) fishery resources are exploited in Ghana. The most common fish captured in Ghana are the small pelagics such as mackerel, horse mackerel, chub mackerel, sardines, sardinella and anchovies. These small pelagic species account for about 70 percent of the total marine fish capture in Ghana. The biomass of the small pelagic resources fluctuate significantly. According to industry and GOG sources the quantities of captured sardinella, chub mackerel and anchovy fluctuate and have reached a point of near collapse. In addition most shrimp vessels have shifted to tuna fishing due to consistently low levels of

shrimp catch. The shrimp industry had subsequently collapsed over the past ten years.

The large pelagic type is mainly tuna. There are three types of tuna species of commercial importance and value including the yellow fin, skipjack, and big eye tunas. These tunas undertake long-range migrations in the Atlantic Ocean and across national boundaries. Tuna is the only fisheries resource that can withstand considerable expansion in Ghana. Ghana is a member of the International Commission for the Conservation of Atlantic Tuna (ICCAT) which is made up of 48 members. The ICCAT operates a quota system for its members to avoid overfishing in the Atlantic Ocean. According to GOG sources, the potential annual tuna fish resource and sustainable catch in Ghana EEZ average yield is 70,000 MT. This area has been given a further boost by the construction of a tuna-landing bay at the main sea port (Tema) in Ghana by the Japanese Government.

According to MOFA sources, biomass survey estimates show that the potential yield of the total demersal biomass on Ghana's continental shelf is 36,000 MT-55,000 MT per year. The demersal species captured in Ghana include cassava fish, red snapper, sea bream, burrito, cuttlefish, red mullet, and croaker.

Composition of the Marine Industry

The marine fishing industry in Ghana consists of three main sub-sectors, namely small scale, (artisanal or canoe), semi-industrial (or inshore) and industrial (deep-sea) sub-sectors. The artisanal sub-sector is the most important contributing 60-70 percent of total annual marine fish output of small pelagic fish species.

Over 12,000 marine artisanal boats (canoes), many of which are wooden, operate in fishing villages along the coast of Ghana (MOFA sources). Many large canoes are motorized with 40 Horse Power (HP) outboard engines. Some canoe operators specialize in hook and line, using ice to preserve the fish stored in insulated containers after catching. A few artisanal operators use electronic fish finding devices such as echo-sounders.

The semi-industrial/inshore fleet consists of locally built wooden vessels 8-37meters in length with in-board engines of about 400 HP. There are over 300 semi-industrial fleet vessels operating from four landing sites along the coast of Ghana. Most semi-industrial vessels are dual purpose; using trawls or purse seines. The fleet exploits both the small pelagic and demersal fish species.

Industrial (deep sea) vessels are large, steel-hulled foreign-built fleets. They are mostly trawlers, tuna pole and line, and purse seiners. As deep-sea vessels the industrial trawlers by law are to operate in waters deeper than 30m deep (Fisheries Act 625, 2002). Most tuna vessels are operated on joint-venture basis with Ghanaians having at least 50 percent shares as required in the Fisheries Act 625 of 2002. There are about 70 industrial vessels operating in Ghana waters according to MOFA and industry sources. The industrial fleets have in-board freezing facilities for preserving fish and can stay for months at sea. It is reported by GOG sources that the industrial fleets have undergone radical expansion in number since 1984 when GOG policy targeted industrial fishing as a mechanism for promoting non-traditional exports. Both pelagic and demersal fishery resources are exploited by the industrial fleets. According to the fishing industry, deep-sea shrimp have become unprofitable and most shrimp boats have switched to tuna fishing. The industrial vessels operate from the deep water ports in Tema and Takoradi which have berthing facilities for industrial vessels. However, Tema Fishing Harbor has the largest landing site. The introduction of demersal pair trawling of vessels in recent times has been of great concern to the GOG because they tend to obstruct and destroy the fishing activities of the small-scale operators on the high seas.

Unauthorized fishing by foreign vessels has severely depleted fish stocks in Ghana's 200-nautical-mile maritime EEZ, causing major government concern. The most affected stocks are the demersal sea

bottom-feeding fish. Tuna stocks reportedly remain unaffected. The monitoring, control and surveillance of the EEZ and enforcement of the relevant fisheries laws are weak, making it difficult to assess the level of illegal fishing and thus the catch by foreign vessels.

Production of Wild Fish Catch from Inland Waters (rivers, lakes, and lagoons)

Ghana has a system of rivers, lagoons and lakes (including Lake Volta, the largest man-made lake in Africa) and fish ponds (aquaculture presented in next section) that forms the basis of an inland fisheries industry. The rivers contribute significantly to the diversity and status of fish stocks in marine waters as many fish species spend part of their life cycle in these rivers. The inland sub-sector is wholly artisanal. These reservoirs are the main sources of fresh water fish in Ghana

The average annual fish production from inland waters (rivers, lakes, lagoons) is about 60,000MT. Lake Volta is the most important inland fishery, with a surface area of about 8,480 km² (900,000ha) and 5250 miles of shoreline. Lake Volta is rich in fish species. Fish catch from the river basins, lagoons and lakes are dominated by tilapia species, mud skippers, grey mullets, crabs, shrimps and oysters.

Lake Volta contributes 70 percent of the total inland fishery production in Ghana according to MOFA. Fishing on the Volta Lake is done by 3-7 meter planked canoes, mostly un-motorized, although outboard engines are becoming more common. The most common fishing gears are hand lines and gillnets. Total fish landings from rivers, lakes and lagoons have been relatively stable but are experiencing a decline in the last three years due to inadequate fishing methods..

Table 3 Total fish catch from rivers, lakes and lagoons 2000-2008(1000MT)

Year	2005	2006	2007	2008	2009	2010	2011
Inland Waters-Rivers, lakes etc	81.5	81.5	81.5	81	75.8	74	73

Source: Ministry of Food and Agriculture (Fisheries Commission)

Production (Aquaculture)

Aquaculture became important in the 1980's when the GOG recognized fish farming as an assured way of meeting the deficit in Ghana's protein requirements. Due to massive GOG support, fish farming became established in many parts of the country. However the growth of the sector was slow due in part to the subsistence nature of fish farming, inefficient and inappropriate production practices, and dependency on government support. In addition the sector faced many challenges including lacking inputs such as fingerlings and fish feed produced commercially to support the growth of the industry.

Commercial fish farming in Ghana is a recent development that has been adopted in the past few years. Presently there are about seven commercial aquaculture farms operating in Ghana and over 200 medium/small-scale fish farms. In the last five years aquaculture production has increased by 80 percent from 2005 to 2010 as a result of proliferation of commercial fish farming particularly the cage farming on the Lake Volta.

Tilapia constitutes over 80 percent of aquaculture production while catfish and others account for the remaining 20 percent. While there is no shrimp/prawn farming in Ghana yet, research shows that there is a great potential for commercial farming of local shrimp species. The majority of the aquaculture operators grow/culture fish in earthen ponds either as a monoculture of tilapia or poly-culture of tilapia with catfish.

Table 4. Total Aquaculture Production in Ghana 2005-2011(1000MT)

Year	2005	2006	2007	2008	2009	2010	*2011
Aquaculture	1.15	1.67	3.26	5.6	7.2	10.2	10.5

Source: Ministry of Food and Agriculture (Fisheries Commission), *Post projections.

Several systems of aquaculture are found in Ghana. They vary from large-scale commercial (intensive), medium scale (semi-intensive) and subsistence or small-scale (extensive), with the latter two most commonly found.

Commercial fish farms comprise about 3 percent of total aquaculture operators. Most large-scale commercial fish farms operate cage culture systems on Lake Volta; others operate both earthen ponds and cage systems. Cage fish farming as a commercial enterprise on the Lake Volta was recently introduced and is being practiced by five (5) commercial fish farmers in the past few years. Cage fish farms contribute over 80 percent of total fish yield in aquaculture production. Lake Volta has many sites that may be appropriate for cage farming. Cages are either locally manufactured or imported plastic material. The average number of cages used per farm ranges from 8-15, arranged in a circular fashion with an average diameter of 15m each. Some commercial fish farmers use the pen type and earthen pond culture as well. The size of the earthen ponds in commercial farms varies, ranging between 2-5 acres. Commercial fish farms only produce tilapia. All-male tilapia culture is becoming widespread. Commercial operators hatch, breed and produce their own fingerlings of best quality in concrete tanks, hapas (hanging nets in tanks) and earthen ponds. They also sell surplus fingerlings to other fish producers. The cages/pens/ponds are stocked with 10g-30g fingerlings which are ready for the market in 6-8 months at an average weight of 250g-350g. However the commercial operators do not produce their own fish feed but buy high quality pelletized balanced feed from animal feed companies.

The majority of fish farmers are small/medium-scale operators. There are over 200 medium/small-scale fish farms, mostly in the southern parts of Ghana. The farmers construct earthen ponds of varying dimensions ranging 0.2-2acres. Earthen fish ponds are mainly located close to wetlands, rivers or in close proximity to some other water body. They may also be spring-fed. Most medium/small-scale fish farmers do not produce their own fingerlings, instead they buy from the large scale farmers; others collect old stocks from other fish ponds or from rivers and streams. Tilapia fingerlings used on most medium/small-scale fish farms are mostly of poor quality. The small/medium-scale operators produce various species of tilapia and catfish.

Most small/medium-scale fish farmers rely on the natural productivity of the ponds to achieve their production. Others use agricultural by products, or poor quality feedstuffs in unbalanced proportions to feed tilapia. Fish growth is slow in the medium/small-scale systems with low yields.

FISH FEEDING

Ghana does not have a feed mill that commercially produces compounded extruded or pelletized fish feed. Also the essential feed ingredients and raw materials necessary to produce such nutritionally balanced feeds are also limited. Expansion of the aquaculture sector is limited by the lack of feed mills producing fish feed. The feed requirement in the aquaculture sector is over 15,000 MT a year. According to MOFA, aquaculture feed is highly specialized and must be a high quality pelletized or extruded product and should float to enable the farmed fish to feed at the top of the water. Most commercial aquaculture operators purchase pelletized fish feed imported from Israel. Currently only one Ghanaian company has established a fish feed mill and is producing feed. The cost of the pelletized imported feed is about \$2,500/ton for fingerling feed, and \$1,200/ton for continued culture feed. Fish

feed is 60 percent of total cost of production of cultured fish.

Post discussions with official sources in MOFA and fish farmers indicate that several options in the feed industry need to be investigated to make it affordable for the industry. For example, in the medium term importing whole compounded fish feed and bulk feed to be re-bagged in Ghana presents a good opportunity. In the long term, essential feed ingredients may best be imported and local blended materials to produce the feed in Ghana.

The long term approach requires investment for the development of feed mills. Existing feed mills in Ghana could look at the possibility of investing in equipments for fish feed production since major inputs (corn, fishmeal) are readily available locally. Although soybean production is limited, soybean meal may have to be imported as aquaculture expands. Anchovy and tuna offal are used for fish meal in Ghana.

The Ghana Investment Promotion Centre (GIPC) advocates the promotion of better animal nutrition and for private sector to establish a fish feed mill to serve the industry but is yet to be realized. According to GIPC, the country has potential to become the West African hub for fish feed mill operations. There are other fish farms operating in the Africa region that need reliable feed supplies. Being a member of ECOWAS, a market with a population of 250 million people, Ghana possesses significant potential to become West Africa's hub for fish feed mill operations.

STORAGE AND PROCESSING

Large tuna fishing vessels have cold storage facilities for either freezing or brine freezing the tuna fish while on the high seas to preserve it and prevent spoilage before landing. About 90 percent of the tuna fish that reaches the Ghana ports is processed industrially and exported. Industrial processing of fish catch in Ghana includes filleting, canning, cutting, packaging, grading, storing and freezing. In addition, the preparation of fishmeal from tuna offal is common.

Presently, Ghana has three tuna canneries operating in the port city of Tema. About 40,000MT of tuna is processed into canned tuna mainly destined for the export market. These canneries meet internationally and EU approved production standards using the Hazard Analysis Critical Control Point (HACCP) method.

About 90 percent of total processed tuna is shipped to the EU. This is because the processing companies are in partnership with a European company. Even though there is demand for the canned fish products in Ghana, only 10 percent of the finished fish products go to the domestic market.

For many years owners of cold stores in the main ports (Tema and Takoradi) in Ghana have bought, froze and stored about 90 percent of the marine fishes landed (apart from tuna) in their facilities. The cold storage method helps to reduce the high post harvest losses that occur during the major fishing seasons in July-September each year. The remaining 10 percent fish is sold as raw fresh fish on the open market. Traditionally, about 60 percent of fish in Ghana is smoked, 10 percent is sundried or salted and the rest is fried, grilled or steamed. Tilapia from aquaculture farms and inland reservoirs is mostly bought by hotels and restaurants. Tilapia is mostly sold as fresh, unprocessed product or cold stored.

CONSUMPTION

Fish is the preferred source of animal protein in Ghana and is consumed by the majority of the people. Ghana's average per capita consumption of fish is estimated at 20-25 kg (FAO). With a population of approximately 24 million fish consumption is estimated at 480,000-600,000 MT but average fish supply per year was about 500,000MT. The demand for fish is higher than what total domestic fish catch can

supply and the gap is widening year after year.

According to MOFA sources (2010 data) fish provides approximately 60 percent of the animal protein consumed in Ghana. About 75 percent of the total domestic fish (captured and farmed) is consumed locally. The preferred fish species in Ghana are the sea bream, red snapper, croaker and cassava fish but these are expensive and unaffordable by the majority of the population. Thus, the affordable types- mackerel, horse mackerel, chub mackerel, sardines and tuna-are mostly consumed. The hotels and restaurants purchase the red snapper, croaker and sea bream.

Fresh/frozen or processed fish is often purchased for the preparation of both exotic and local dishes by restaurants, hotels, caterers and fast food operations and for domestic use. Processed fish available on the open market includes smoked, salted, dried, salted and dried, fried or grilled, usually not packaged. Even though the demand for canned tuna fish products is high, only 10 percent is sold locally. Although fish has become expensive in the Ghana market during the last few years due to scarcity, it is still the cheapest source of protein compared to meat and meat products. Fish prices are affected mostly by the quantity, quality, type and size of fish. For example the small pelagics (sardines, mackerels etc) cost GHC30.00 (\$20) per kg; the demersal fishes, such as the red snapper, sea bream, croaker, cassava fish, cost between GHC40-80 (\$14-27) per kg. The price of the small pelagics drops during the local fishing season in Ghana.

TRADE

Ghana is a net importer of fishery products. Post forecasts fish imports in MY 2011 at 250,000 MT, up from 199,000 MT in MY 2010 due to increasing demand. According to GOG sources the national fishery requirement in Ghana has grown from an average of 400,000 MT in 2002-2005 to approximately 800,000 MT in 2008-2010. It is expected that this gap will continue to remain wide for the next fifteen (15) years or more thus, creating opportunities for fish imports and further growth in aquaculture. Imports and exports of fish are regulated and require a permit from the GOG. Imports of aqua cultured fish, however, are prohibited. There are increased fish imports from November to May (lean local fish season), which drop in July-September when there is active local fishing.

Table 4: Total Fish Supply in Ghana ('000 MT)

Year	2005	2006	2007	2008	2009	2010	*2011
Total fish Prod	405.5	406	376.8	436.6	326	305	300
Imports	166	165.6	212	191.6	182	199.8	250
Fish exports(Tuna)	62	45	56.9	56	71	62	62
Total Fish Supply	509.5	526.6	531.9	572.2	437	442.8	488

Source: Ministry of Food and Agriculture (Fisheries Commission), *Post projections

Imported seafood is shipped in brown boxed packages with weights ranging from 10 kg, 20 kg, 25 kg or 30 kg depending on the buyers' request. The number of fish per box varies with the fish sizes (small, medium, large), and ranges from 80 to 120 units per box. The main imported fish species are mackerel, horse mackerel and sardines/sardinella. Others include croaker, sea bream, red snapper but on a minimal scale.

According to the trade, U.S. fish exports to Ghana would be more competitive if shipments were transported in bulk (average shipment of 1,500 – 2,000 MT). The major suppliers of fish to Ghana are Mauritania, UK, Poland, Netherlands and Belgium. Other suppliers are Morocco, Norway, Senegal, Namibia, and the Gambia. Although Ghanaians perceive U.S. fishery products to be of a high quality and low export prices, freight rates adds to the cost of U.S. supplies.

A large number of importers/distributors have cold storage facilities located at the main fishing port in Tema near Accra. A few cold stores are in the Takoradi fishing port in the western part of Ghana. In addition there are rented cold storage facilities in these ports and cities that are available to wholesalers/distributors with smaller capacities. About 70 percent of imported frozen fish land at the Tema port, and 30 percent at the Takoradi port, from where the fish starts being distributed through internal trade channels. The trade channels include wholesalers and retailers who purchase the fish from the importers at cold storage facilities at these ports, then sell in the traditional open market where most of them are located. Small quantities of dentex fish are imported as feed for the poultry industry.

The Customs Division of the Ghana Revenue Authority is the GOG institution responsible for the collection of import duty. Tariffs on all fishery (including fin fish and invertebrates) is 5 percent, Value Added Tax (VAT) 12.5 percent charged on CIF value; ECOWAS levy 0.5 percent; Export Development and Investment Fund Levy (EDIF) 0.5 percent; Inspection fee 0.1 percent; Ghana Customs Network (GCNET) charge 0.4 percent. The total tax is approximately 21.5 percent of the CIF value. The national Health Insurance Levy (NHIL) 2.5 percent has been effective since August 1, 2004. Importers pay a fish import levy of GH¢2.00 (US\$ 1.33) per MT which is paid into the Fisheries Development Fund and is used for the development of fisheries, including aquaculture.

RESOURCE MANAGEMENT/PRODUCTION POLICY

The GOG has supported the fishery sector through various means such as subsidy of fuel for outboard motors; controlling large trawlers via licensing; legislation that requires Ghanaian majority ownership of fishing enterprises landing their catch in the country; and attempts to stimulate investment in fisheries related infrastructure. Most tuna vessels are operated on joint-venture basis with Ghanaians having at least 50 percent shares as required in the Fisheries Act 625 of 2002 (see below). These measures have been open to corruption and abuse, and are not easy to enforce. This has resulted in frequent tensions between the fisheries sector and the government of the day. The Fisheries Act 625 mandates the minister responsible for the sector to declare open and closing dates for the fishing season in order to conserve marine species but this has never actually happened.

The fisheries industry in Ghana is regulated by the Fisheries Act, (Act 625) of 2002. This act is supposed to consolidate with amendments of all the foregoing laws on fisheries Acts, Decrees, Laws, Legislative Instruments (and other subsidiary/subordinate legislation) on or relating to the sector that are still in force. The Fisheries Act, 2002 (Act 625) includes provisions for the regulation and management of fisheries, the development of the fishing industry, the sustainable exploitation of fishery resources and to provide for related matters.

In accordance with the Fisheries Act 625 of 2002, all the fishing vessels operating along the marine coast of Ghana must be registered. According to the GOG, this registration and the Identification Number would become useful instruments to assist the Fisheries Commission to build a national Fishing Vessel Register and help to compile statistics and data on fish capture, information on number of fishing vessels including canoes, and fishing gear used. Since the exercise started in 2010 industrial and semi-industrial fleets have been compliant, but the artisanal canoes operators have not.

The law also provides for a regulatory body, the Fisheries Monitoring, Control, Surveillance, and Enforcement Unit, as well as a fisheries advisory council. In November 2005 the GOG procured a vessel monitoring system to check illegal fishing in Ghana. Unfortunately, the monitoring, control and surveillance of the Exclusive Economic Zone (EEZ) and enforcement of the relevant fisheries laws are weak, making it difficult to assess the level of illegal fishing.

The Fisheries Regulations, 2010 (LI 1968) Sections 11 (1), (2) and (3) prohibits for any person to use any fishing method that aggregate fish either by light attraction, use of bamboo for purposes of aggregating fish, or use of explosives, or any obnoxious chemicals for fishing, or operating pair trawling. It is also an offence under Sections 12 (a) and (b) of LI 1968 for anyone to use un-prescribed mesh net sizes for fishing. In recent times over 10 vessels have been arrested by the Ghana Navy for using lights to attract fish.

Aquaculture development is also governed by the Fisheries Act of 2002 (Act 625). The permits required under the law for aquaculture operations are:

1. An Environmental Impact Assessment report approved by the Environmental Protection Agency;
2. A permit from Water Resources Commission (WRC) to use water;
3. An approval from the Director of Fisheries;
4. A letter of consent or a no objection to the project from the chief and people of the area (community);
5. No objection from District Assembly of the area (community);
6. A permit from the Volta River Authority to locate on the Lake Volta to produce fish;

The Food and Drugs Law, 1992, prohibits the sale of unwholesome, poisonous or adulterated and unnatural substances and lays down penalties for breaching the law.

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